Register Number:……..

KUMARAGURU
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B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Fifth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U18EEE0002**:** Electrical Energy Utilization and Conservation

COURSE OUTCOMES

CO1: Design illumination systems and heating elements depending on the requirements.
CO2: Understand the concepts of electric heating, welding, electric traction and braking system.
CO3: Understand the concepts of electro chemical processes.
CO4: Estimate the different types of tariff structures, impact of tariff and methods of optimizing the tariff by energy conservation.
CO5: Understand the concepts of Energy Management and Audit.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	What is electric heating? What are the advantages over other methods of heating?	CO1	[K_1]
2.	Why CFL and LED lamps are becoming more popular now-a-days? Explain technically?	CO1	[K_2]
3.	Summarize the merits and demerits of electric traction	CO2	[K_2]
4.	Outline the factor which affects the specific energy consumption in electric trains.	CO2	[K_2]
5.	List the types of batteries.	CO3	[K_1]
6.	Compare electrolysis and electroplating.	CO3	[K_2]
7.	Explain the causes and effects of low power factor.	CO4	[K_2]
8.	Illustrate the significance of Power factor correction.	CO4	[K_2]
9.	Identify the importance of performing Energy Audit practice in any organization.	CO5	[K_3]
10.	What is the role of energy manager in process industry?	CO5	[K_2]

Answer any FIVE Questions: -
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Explain in brief how heating is done in the following cases: i) Resistance heating, ii) Induction heating iii) Dielectric heating.	8	CO1	[K_2]
	b)	Build the construction and explain the principle of operation and applications of i) Filament Lamp ii) Sodium vapour lamp.	8	CO1	[K_3]

12.	a)	Develop the expressions for the tractive effort exerted by road wheel in terms of wheel diameter, motor torque, gear ratio and efficiency of transmission of power through gears.	8	CO2	[K_3]
	b)	Summarize the factors affecting energy consumption in propelling the train.	8	CO2	[K_2]
13.	a)	Explain the electroplating process in detail.	8	CO3	[K_2]
	b)	Identify the different charging methods of batteries. Also explain each of them.	8	CO3	[K_3]
14.	a)	A synchronous motor having a power consumption of 60 kW is connected in parallel with a load of 200 kW having a lagging power factor of 0.86. If the combined load has a power factor of 0.95, what is the value of leading reactive kVA supplied by the motor and at what power factor is it working?	8	CO4	[K_3]
	b)	Explain about energy conservation aspects in ventilation systems.	8	CO4	[K_2]
15.	a)	Illustrate the different steps that are considered for detailed Energy Audit.	8	CO5	[K_3]
	b)	Choose reasons for the need of Energy Audit in any industry.	8	CO5	[K_3]
16.	a)	Identify the properties of heating elements. Explain about any two types of induction furnaces.	8	CO1	[K_3]
	b)	Construct a welding transformer and develop its characteristics.	8	CO2	[K_3]

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